MISSOURI
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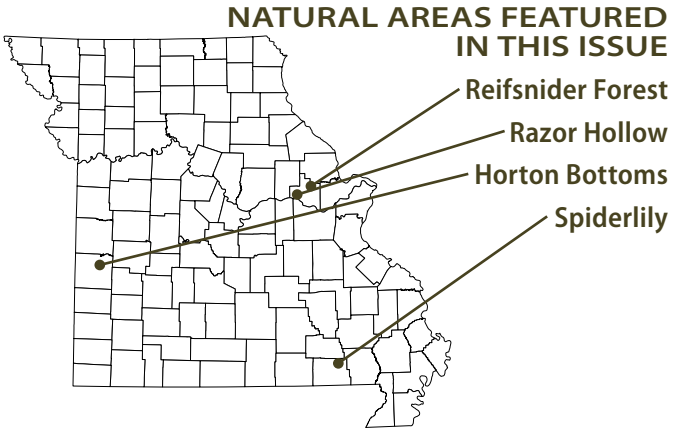
"…identifying, designating, managing and restoring the best remaining examples of natural communities and geological sites encompassing the full spectrum of Missouri's natural heritage"

Missourians Support Natural Area Management, and the Relationship Needs to Be Strengthened

By David H. Thorne, Public Involvement Coordinator, Missouri Department of Conservation

What do Missourians think about natural areas? They like the idea, although they may not know much about the details. The support of Missourians for natural areas in Missouri might be described as the way they would think about the gift of a three-stone diamond ring for a special person in their lives. The three stones represent the past, present and future; and for natural area management, Missourians have supported the idea in the past, believe in the success of the present, and have generally been willing to pay for the hope and promise of the future. However, when faced with some choices between nature and the more immediate demands of living, Missourians may, just like the individuals that consider a diamond ring, like the idea and enjoy looking at pictures in an advertisement, but they're not sure they can afford it. There are also clues that more Missourians are unaware of the benefits that nature and natural area management offer to themselves, their children and the future of Missouri.



Natural areas are the gems of the past, present and future.
David H. Thorne

The Past: Missourians, compared to the rest of the United States, have been uniquely supportive of conservation tasks. The establishment of the Missouri Department of Conservation in 1936 by initiative petition and the resulting over 2-to-1 ballot approval is one measure. Jim Keefe, in the book *The First Fifty Years*, describes the early philosophy for the Constitutional Amendment that established the Department of Conservation as including "the interests of all citizens in the wildlife of the state, that they would need this broad support if their efforts were to succeed," and "it should concern itself with songbirds as well as game creatures and should embrace forestry." Another is the ballot initiative to establish, in 1976, consistent funding for "woods and wildlife" in Missouri through the Conservation Sales Tax. Missourians were the first to approve this kind of funding approach for fish, forests and wildlife. Among the promises made with the proposal of the Conservation Sales Tax was to "acquire natural areas or preserve them on existing Department lands." Natural areas were described then as "ecological communities representing Missouri's natural heritage of plants and animals." The continued support for the Missouri Parks and Soils Tax is another measure of support for nature and outdoor amenities. The recent support in 2006, with over 70 percent approval, is the fourth time that the Parks and Soils Tax has been approved by Missourians. These examples of support in the past clearly are an indication of the strength of support for the importance of nature and the outdoor world.

The Present: In a 2003 random survey of all Missourians, conducted for the Missouri Department of Conservation by the University of Missouri, over 6,350 Missourians responded to a wide variety of conservation questions. When asked about their interest in Missouri's fish, forests and wildlife, over 93 percent responded they were interested. Missourians agreed that land should be acquired for fish, forest and wildlife conservation (73 percent), that rare and endangered plants should be conserved and restored (79 percent), and that it is important for outdoor places to be protected even if they did not plan to visit the area (91 percent). Almost all indicated that "natural areas" should be designated to protect Missouri's best examples of forests, prairies, marshes, and glades (84 percent). A clear majority (57 percent) strongly agreed. Most Missourians worry, at least a little, about the loss of natural habitat for wildlife (87 percent), and most responded that they are interested in observing, in the outdoors, examples of Missouri's forests, grasslands, and wetlands (85 percent).

Yet, the relationship is not always direct or entirely positive. In the 2003 survey, a majority of Missourians had not visited a natural area (56 percent) and 12 percent responded "Don't Know." Just less than one-half indicated they could use information about Missouri designated natural areas (49 percent). Relatively few responded that they were a member of an organization interested in the environment or outdoor activities (20 percent), and even fewer volunteered in those types of organizations (11 percent). Almost one-half of Missourians approved of filling wetlands if the land could be used to produce more jobs and income (47 percent); and over one-half provided approval that protecting wildlife was fine, unless it hurt the economic livelihood of people who make a living off the land (55 percent). And as a predictor of the ease of participation, less than one-half strongly agreed that enjoying nature is an inexpensive past-time (49 percent).

Even more insightful are the results from recent focus groups, conducted by Fleishman-Hillard Research of St. Louis in 2007, that were held across Missouri with urban adults that were age 25 to 40. These Missourians indicated that their backyards and community parks define much of their exposure to nature. The "outdoors" is valued as a place for family play and escape, but it's more likely to be the backyard than any other location. These Missourians would consider forests, conservation areas, and natural areas as the outdoors but the focus group participants did not mention these types of areas or use terms like "wildlife habitat." They did respond positively to the word "nature" and indicated it is something that their children are curious about.

The Future. It should be of great concern that the direct connection Missourians have with nature (and by extension, their understanding of what natural area management might be about) could become weaker than in the past. And because over 70 percent of Missourians live in urban areas and this trend to live in urban and suburban areas is increasing, it's likely that in the future Missourians will have even less of a connection with the real "nature" of Missouri, especially that represented by natural areas. This does not mean that more individuals need to visit natural areas, join conservation organizations, or be directly involved in management. Those actions could help, but are not required. It does mean that Missourians need information and opportunities to understand how natural-area management benefits their daily life and that it is an investment in their own and their children's future. There are currently 182 state-designated natural areas in Missouri that cover a total of over 65,000 acres, yet this is only about one-tenth of one percent of the total acres in Missouri. This is an important message to communicate. The endeavor of natural area managers has been and continues to be focused on securing the "gems" of the very best examples of Missouri's great variety of natural communities of plants and animals. An additional task in the future will be to establish, using what a business would call relationship marketing, a deep and emotional link in the minds of current and future generations of Missourians that the success of the natural world is their own success, both economically and for an improved quality of life. This marketing approach requires time, a focus on developing a long-term trend of support by interested individuals, continued funding, and developing ownership in the supporter's mind of a word or thought about natural areas.

The outcome is to have Missourians say or think that they can't imagine a world without natural areas, or nature, or whatever words are meaningful to them to describe natural communities. They have to know that nature includes the backyard, but is also way beyond it. These outreach efforts must touch Missourians frequently with the words and images they can understand about the good works of natural area managers and the kinds of places that are being managed. They already like the idea, they just don't know about the details. As Aldo Leopold wrote in 1949, "Lastly, there is the professional, striving through countless conservation organizations to give the nature-seeking public what it wants, or to make it want what he has to give." As stewards and managers of natural areas in Missouri, the natural areas are the ring. Now, we have to work on the relationship with each Missourian. In this manner, the depth of the relationship that Missourians have with natural areas might be strengthened and natural area management activities might continue to be viewed as a desired and successful outcome. ▲

Fleishman-Hillard Research. 2007. Outdoor Values of Missourians: a Focus Group Report to Missouri Department of Conservation. Fleishman-Hillard, Inc., St. Louis, Missouri. 66 pp.

Keefe, J. F. 1987. The First Fifty Years. Conservation Commission of the State of Missouri, Jefferson City, Missouri. 446 pp.

Leopold, A. 1949. A Sand County Almanac and Sketches Here and There. Oxford University Press, New York, New York. 228 pp.

Rikoon, S., J. Hermsen, T. Goedeke, and K. McElmurry. 2004. Your Ideas Count: Report of Results of the 2003 Conservation Opinion Survey for the Missouri Department of Conservation.

University of Missouri Department of Rural Sociology, Columbia, Missouri. 558 pp.

COMMENT FROM THE EDITOR. . .

This issue focuses on the theme "Human Connections to Natural Areas." Generally, when we think about natural areas our first thought is in ecological terms—i.e. how does this area add to biological diversity and stability of a given ecological system. But whoa! As Adrian Brown aptly pointed out in the last issue of the *Missouri Natural Areas Newsletter*, we must "make natural areas tangible in peoples' lives. The connections natural areas can provide, the values they hold for all of us, and how we speak and act towards them must be strengthened for the sake of the natural world." Further, in his book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* (Algonquin Books of Chapel Hill 2006), Richard Louv offers a discourse on how and why children of today are **disconnected** from the natural world and steps that need to be taken to turn that around.

Hence the theme of this issue. Natural areas offer a range of values—grading from purely ecological to purely humanistic. The key word is "grading," because of our individual perspectives. In this issue you will find a series of articles addressing natural areas from a variety of angles—public perspectives, recreational opportunities, scientific values, educational values, private landowner values, millennial generation thoughts, philosophy of designating and managing natural areas including perspectives of two Missouri Natural Areas Committee members, and an example of a negative influence on natural areas, feral hogs. We hope that the words of these authors will generate thought and discussion and, most importantly, your commitment toward communicating these values to the next generation through personal involvement with kids!

Finally, after nearly five years as your editor, this issue is my last. I truly have enjoyed being your editor because, like most worthwhile endeavors, I have gained more than I have given. Because of you, the authors and readers, my perspective and understanding have broadened and I've become acquainted with many fine folks who are knowledgeable about their work and who hold passionate interest and commitment to natural communities. Thank you for that! And now, I'm off to play with the grandkids and do some natural community restoration of my own.

Wayne Porath, Editor
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Trails Connect People to Places

By Denise Dowling, Interpretive Specialist, and Kelley Brent, Trails Coordinator, Missouri Department of Natural Resources

Missouri's state parks provide easy access to natural areas representative of the diversity of natural landscapes in each of the state's ecological regions. For more information, go to **http://www.mostateparks.com/natareas.htm**.

This trail within Cuivre River State Park provides easy access to Lincoln Hills Natural Area.
Bruce Schuette, Department of Natural Resources

Missouri is a great state rich with a diversity of flora and fauna that make up a variety of terrestrial and aquatic natural communities. These communities range from prairies, to forests and woodlands, to swamps and streams. The Missouri natural area designation represents the highest quality examples of our terrestrial and aquatic natural communities. They often serve as core areas within larger landscapes that have been identified as focus areas for the conservation of biodiversity that is significant at regional, national or global levels. Natural areas are to be protected in perpetuity but to do this requires public understanding and support. Trails connect people to places. In the context of natural areas, trails provide an experiential avenue for transferring knowledge about natural diversity, historic landscapes and ecological management. Our hope is that these experiences become deeply rooted within our collective consciousness, and that we lend greater support to a land ethic that embraces active stewardship and preservation.

Many natural areas have trails or are a part of expanded trail systems, which allow the user to become deeply immersed in the quality and diversity of these special places, without the fear of getting lost. For example, the Lincoln Hills Natural Area, within Cuivre River State Park, features a diverse landscape of bottomland forests, woodlands, prairies, glades, sinkhole ponds wetlands and caves. It supports 28 species of conservation concern including the federally listed running buffalo clover (*Trifolium stolonferum*), 2,005 native plant species, 40 nesting neartic neotropical migrant birds, and over 2,300 species of insects. Lincoln Hills is the best remaining example of a Mississippi River Hills landscape. As a core area within the Cuivre River Conservation Landscape, it provides access into a distinctive subsection of the Central Dissected Till Plains.

If your interest is birds, trails provide access to some of the most important bird watching areas in the state. You can spend a weekend visiting one of the wetland natural areas in the Mississippi River Alluvial Basin of Missouri such as Big Oak Tree Natural Area and find fish crows (*Corvus ossifragus*), Virginia rails (*Rallus limicola*) and American bitterns (*Botaurus lentiginosus*) along with prothonotary warblers (*Protonotaria citrea*), swamp sparrows (*Melospiza georgiana*) and the state-listed Mississippi kite (*Ictinia mississippiensis*). The next weekend a drive to the woodland natural areas of the Ozarks would yield a different suite of bird species such as scarlet tanagers (*Prianga olivacea*), black-and-white warblers (*Mniotilta varia*), worm-eating warblers (*Helmitheros vermivorus*) or brown creepers (*Certhia americana*). Meramec Mosaic Natural Area (Meramec State Park) would be an excellent destination. These sites occur within a larger designation called an Important Bird Area. The Important Bird Areas Program (IBA) is a global effort by the National Audubon Society to identify and conserve areas that are vital to birds and other native species. But even if you are not interested in particular plants or animals, natural areas provide a great opportunity to enjoy, explore and appreciate nature.

Trails connect people to places, but if heavy use degrades them, protective measures are needed. Missouri natural areas are managed for the purpose of preserving their natural qualities. The limits of acceptable change need to be identified as an integral part of management planning with the integrity of these special designations afforded the highest priority.

Trail users can be important advocates for natural areas protection. The Missouri Department of Natural Resources (MoDNR) has teamed up with recreational groups and Leave No Trace to offer certification for staff to teach Leave No

I think often of a wonderfully honest comment made by Paul, a fourth-grader in San Diego: "I like to play indoors better, 'cause that's where all the electrical outlets are."

Richard Louv. 2006. *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*

Trace awareness courses. Leave No Trace is a national and international program designed to assist outdoor enthusiasts with their decisions about how to reduce their impacts when they use trails. The program strives to educate all those who enjoy the outdoors about the nature of their recreational impacts as well as techniques to prevent and minimize them. Leave No Trace is best understood as an educational and ethical program, not as a set of rules and regulations.

If you have ever arrived at a trailhead to a natural area only to find trampled cigarette butts and assorted trash, you know why the Leave No Trace program was created. MoDNR has also teamed up with other land management agencies, such as U.S. Forest Service, Missouri Department of Conservation, and National Park Service, by extending the invitation of the certification training to each agency to teach comprehensive outdoor ethics concepts to staff, who then pass on the information to visitors each day.

In addition to environmental education, MoDNR has initiated a GIS-based trail inventory to compile detailed information on the extent and condition of recreational trails. Together with detailed soils layers, natural area boundaries, and information on the distribution of state-listed species there will be better coordination for trail construction and management. Special attention is already given to sensitive areas such as wetlands, bottomland forests, and caves that have special needs for trail construction including boardwalks or other raised surfaces to prevent visitor impacts. Prior to any new trail construction, natural and cultural clearances are approved on every area of designated use. These clearances help to ensure that our natural and cultural resources are not being compromised. Along with the Leave No Trace program these efforts will help us protect and maintain all of our resources including natural areas.

People use trails for a variety of reasons such as getting exercise, finding solitude or companionship or just getting outdoors. Hiking a trail in a natural area provides a distinctly different type of experience. You may become absorbed watching an orangethroat darter glide beneath the surface of a gurgling stream. Or you may close your eyes to listen to the melodic symphony of birds and insects. There are 182 natural areas designated throughout the state. Many have trails and are primary destinations for your next high-quality outdoor experience. The Directory of Missouri Natural Areas, available online at **http://mdc.mo.gov/areas/natareas/**, provides information on these areas.

For more information about the Leave No Trace program, visit **http://www.LNT.org** ▲

The Scientific Value of Natural Areas

By David C. Ashley, Professor of Biology, Missouri Western State University

Darkness had arrived as we quietly sat waiting at Tarkio Prairie Conservation Area on a July evening. Sharon, my wife, asked about the sweet smell that had just become apparent. I smiled and explained that the prairie orchids near our camp chairs had just released a plume of invitation for meandering night-flying insects.

Contrary to the opinion of many when they think of orchid habitats, the western prairie fringed orchid (*Platanthera praeclara*) does not occur in shaded woodlands, but is found in mesic (moist) prairies. The western prairie fringed orchid is listed as a Missouri endangered species and federally as a threatened species. Historic state records indicate a previous distribution throughout many western counties in the state but, today, the beautiful plant is limited to three populations in northwest Missouri. All three Missouri populations are found in high-quality prairies (Tarkio Prairie in Atchison County, Little Tarkio Prairie in Holt County and Helton Prairie in Harrison County) with Missouri natural area designation.

Sharon and I had traveled to Tarkio Prairie to collect observational data on insects visiting the prairie orchids. We were searching for orchid pollinators. We had arrived at the prairie in late afternoon and had placed our chairs at a spot where we could easily observe several flowering orchids. Our hope was to observe the diversity of insects that visited the flowering plants and to collect voucher specimens of individuals that fed from the long orchid nectar spurs. Our vigil began. An occasional fly visited the plants but they did not spend much time exploring the white flowers.

As the day drew to a close, I spotted small objects streaking across the prairie landscape. The objects were too small to be birds and moved too quickly and purposefully to be butterflies or bees. I suspected they were moths of the family Sphingidae. These hawkmoths are strong fliers and primarily nocturnal. The brief speedy forays across the prairie were probably their warm-up flights as they prepared for a night cruising the prairie and adjacent woodland in search of flowers rich in nectar. I was particularly interested in the prairie hawkmoths because species in this group of insects have been documented carrying pollen packets of the western prairie fringed orchid. I used my tape recorder to archive the time and approximate locations of their flights.

As the night progressed, we watched for hawkmoths visiting the orchids. When it was too dark to clearly view the orchids, we used flashlights with a red filter. When we spotted

Blooming western prairie fringed orchid on Tarkio Prairie, June, 2001
David Ashley

Undisturbed natural areas provide an opportunity to conduct research on the biota in areas for which we do not have to account for the influence of human activities. They give us a clearer picture of natural relationships and interactions among organisms with their environment .

Dr. Robert Sites, Entomologist, University of Missouri—Columbia

an insect visitor to the plant, we would observe its behavior and collect it as a voucher specimen. We would carefully examine the head for presence of orchid pollinia (large packets of orchid pollen). This is the most confirmatory evidence that the moth is a pollinator of the orchid. Some moths are nectar thieves on the orchid flowers. Their proboscis is so long the insect can hover adjacent to the orchid flower and never touch its head to the flower parts containing the pollinia. The pollinia are never transferred to the insect body and never transported to another plant. The proboscis length of other species of hawkmoths is much shorter. When moths with this length proboscis visit the plants, they extend their proboscis full-length and probe the nectar spurs of the orchid. They are so vigorous in this behavior that the flower shakes as the moth pushes its proboscis deep into the nectar spur. The sticky pollinia become attached to the moth head, often to the base of the proboscis or directly on the moth eyes. When this insect visits another flower, the pollinia fall off on to the subsequent flower and it is pollinated. One can determine, by mid August, which flowers were pollinated and which were not. The flowers that received a pollen packet have developed into seed pods that are plump with thousands of dust-like orchid seeds. Flowers that were not pollinated have senesced to thin, spindly structures lacking seeds.

Seed production is critical for the survival of this species. This orchid does not vegetatively propagate smaller plants from a larger plant. The plants must produce flowers and then viable seed pods to reproduce.

I've spent many hours sitting by plants from dusk to dawn. Most hawkmoth visitation to flowers I have observed has been between 9 and 11 p.m. I've also spent much time using a variety of light-traps to monitor hawkmoth diversity and abundance on these three prairies. I've collected representatives of 19 species of sphingid moths over the last 17 years of working on this project. Not all of these are viable prospects as orchid pollinators. Many hawkmoth species do not feed as adults and have vestigial probosces. They emerge from the moth cocoon, mate, lay eggs and then die. They would not be involved in pollinia transfer.

Our remaining Missouri populations of the western prairie fringed orchid are located on high-quality prairies. Perhaps there are a few additional orchid populations that have not been reported but it is obvious the current distribution of this species is much reduced compared to the historic distribution. It is quite likely that loss of appropriate habitat (a typical factor leading to endangered status for many species) has been a major factor in the demise of the western prairie fringed orchid in our state. As native prairies (with rich soil resources) were converted to cropland, we lost most of our prairie fringed orchid populations. It is also quite likely that the clearing of prairie and adjacent woodland impacted distribution and abundance of less obvious insect species, particularly those with strong specificity for larval food plants. We certainly know less about the distribution and natural history of some of these insect pollinators than we do about the more charismatic and obvious plants like the attractive prairie fringed orchid.

The mere presence of one or two species of conservation concern does not warrant natural area status. Designation as a Missouri natural area occurs after a rigorous assessment process that confirms the presence of natural, historic, native biotic communities. These natural areas provide the control group for studying ecological processes in Missouri. ▲

Educational Values of Natural Areas

By Allison Vaughn, Resource Steward, Missouri Department of Natural Resources

In recent years, environmental issues have risen to a prominent place in media and Congress; but in schools, students are hearing less of these issues than ever before. With the enactment of the 2002 No Child Left Behind Act (NCLB), environmental education became an unwitting casualty to new curriculum requirements. School boards unanimously slashed funding for environmental education, forcing educators to abandon outdoor learning in an effort to prepare students for standardized tests. Visits to nature centers, wildlife refuges and state parks, all beneficial for instilling respect for our natural surroundings, diminished. School group attendance at Ha Ha Tonka State Park dropped from 78 school groups in 2002 to 45 in 2007.

The NCLB Act expired in 2007. Largely driven by the Sierra Club, Audubon Society and other environmental organizations, Congress drafted new legislation providing for outdoor environmental education programs called No Child Left Inside (NCLI) Act. This amendment to the updated 2007 NCLB Act provides funding for outdoor learning and opportunities for fieldwork such as vegetative monitoring and stream ecology. Educators will have access to environmental education grants and the tools to incorporate environmental education within the framework of a curriculum entrenched in math and reading. NCLI was referred to the Senate committee in August 2007, where it was read twice and referred to the Committee on Health, Education, Labor and Pensions. President George W. Bush recently called for bipartisan support to pass the 2007 acts.

Within the context of environmental education, Missouri's natural areas have long served schools by providing an outdoor classroom that represents the finest in natural, undisturbed ecosystems. The extensive network of natural areas serves as a baseline for comparison with altered or otherwise managed environments, while existing as a blueprint of the state's native ecosystems. Outdoor learning in natural areas offers students the opportunity to understand their environment in a context unparalleled in the classroom setting. By understanding and appreciating native landscapes students are better prepared to address decisions and policies that directly impact our natural resources. Without the understanding and knowledge of healthy, functioning landscape components, students will not have the appreciation and ability to preserve them in the future.

For many years, students of all ages have visited Ha Ha Tonka Karst Natural Area to participate in outdoor learning. While there, elementary school groups learn about karst topography, relationships between groundwater and surface water, and watershed protection. Students begin their hike at the top of the bluff, where they take part in a basic discussion of the geologic forces that shaped the area. They walk under the natural bridge to learn about the various stages of collapse, and end their hike at the mouth of the 12th largest spring in Missouri. Unblemished examples of sinkholes, caves, chasms, cliffs, springs and the natural bridge illustrate valuable lessons of geology and the importance of understanding hydrology in karst systems. Short walks inside the 70-acre natural area permit students to see geologic functions at work, otherwise not provided by textbooks. If the NCLI initiative passes, this and other natural areas will remain benchmark sites for conceptual outdoor learning and landscape functions.

Natural Areas are the reference library that informed restoration activities require in order to perform correctly. Beyond a mere reference, natural areas provide living demonstrations of water, nutrient, energy, and carbon cycling patterns essential to landscape stability and productivity. Once ubiquitous and awesome these natural areas are often merely examples remaining to inform, inspire, and sustain us.

Kent Fothergill, Entomologist, Southeast Missouri State University

Increased awareness of the natural world gained through education better prepares children to be advocates of native landscapes in the future.
Missouri Department of Natural Resources

Across the road from Ha Ha Tonka Karst Natural Area, Ha Ha Tonka Savanna Natural Area exemplifies a thriving, intact dry chert woodland/dolomite glade/calcareous seep complex. Naturalists and researchers have recorded an extensive species list of trees, shrubs, vines, grasses, sedges, ferns and wildflowers, including more than 20 species of conservation concern. The rich biodiversity within this natural area not only illustrates the importance of prescribed fire in landscape management, but provides students a benchmark to compare diverse, well-managed oak woodlands to the degraded, impoverished woodlands adjacent the park.

In Coakley Hollow Natural Area at nearby Lake of the Ozarks State Park, naturalists introduce students to stream ecology in this Outstanding State Resource Water. Aquatic entomologists track and record various macroinvertebrate species that indicate stream health. While on naturalist-led bird hikes, students walk through three distinct terrestrial communities ranging from dry-mesic bottomland woodlands, dry-mesic chert woodlands and finally desert-like glades. Students witness changing bird diversity between the communities and learn about their adaptations.

In June, 2007, University of Missouri's Forest Ecology class witnessed outstanding examples of two contrasting and divergent terrestrial natural communities at Ha Ha Tonka Savanna Natural Area and Big Oak Tree Natural Area, among others. Naturalists asked students to identify communities based on the determining characteristics as set forth in Paul Nelson's *Terrestrial Natural Communities of Missouri*. Both state parks portray these characteristics so well, in fact, that each was chosen to represent the natural communities in the book. Students left both state parks with a better understanding of two vastly different landscapes, from Big Oak Tree's river-flooded wet bottomland forest and swamp to Ha Ha Tonka's fire-dependent dry chert woodlands. Understanding how these natural areas represent once-common landscapes, students visualized how they fit into the state's natural history.

Also in summer 2007, Dr. Alan Journet of Southeast Missouri State University incorporated fieldtrips to nine natural areas in his General Ecology class (Vancill Hollow, Bradyville, Mudlick Mountain, Chariton River Hills, Locust Creek, Pickle Creek, Hunkah Prairie, Tzi-Sho Prairie and Regal Prairie). Students were instructed to collect and analyze data on the distribution of tree species and assess the differences and similarities between sites. Without the broad spectrum of communities and high floristic qualities provided by natural areas, Journet's students likely would have had a difficult time determining communities.

A recent study by James Farmer (2007) proved that outdoor field visits to natural landscapes enhance cognitive learning. The study revealed the long-term effects of an environmental education fieldtrip on a class of 4th graders. Students traveled to Great Smoky Mountains National Park as a class. Using qualitative measures, researchers determined how the students made sense of the personal experience and what meaning the experience had in their lives. Results showed that students were able to recall what they had heard and seen at the Great Smoky Mountains a year later. Moreover, after the field trip, students had developed a perceived pro-environment attitude and were more attuned to environmental issues.

Another high school study separated high school students into three groups. Group A was taught ecology by going to the school farm, pond and nearby stream, while students in Group B were taught ecology strictly in the classroom. Students in Group C were not taught, but had previous knowledge of ecology. Findings revealed the highest performance of Group A relative to Group B and Group C. Students in Group A, the students who learned in the field, were thus "able to perform highest because of their opportunity of having first-hand experience of organisms in their natural habitat" (Hamilton-Eke 2007).

The biodiversity found in Missouri's natural areas undoubtedly enhances field-based education by helping us to understand our rich natural heritage in unblemished, properly managed landscapes. Encouraging more students to use our natural areas for educational purposes increases their awareness. This increased awareness better prepares them to protect native landscapes in the future. If the NCLI legislation passes, our country's youth will have easier access to appreciate healthy, diverse landscapes. With that appreciation, they will be better equipped to tackle environmental issues looming large on the horizon today, including the very protection of our resources. ▲

Farmer, James. 2007. An Elementary School Fieldtrip: Long Term Effects on Ecological and Environmental Knowledge and Attitude Development. Journal of Environmental Education 38:3. pp. 33-42.

Hamilton-Eke, Joy Te-Lu. 2007. Relative Effectiveness of Expository and Fieldtrip Methods of Teaching on Students' Achievements in Ecology. International Journal of Science Education 29:15. pp. 1869-1889.

Nelson, P.W., et al. 2005. The Terrestrial Natural Communities of Missouri, Revised ed. The Missouri Natural Areas Committee, Jefferson City, Missouri. 550 pp.

No Child Left Inside Act, H.R. 3036, S. 1981, requires schools (K-12) to develop and implement environmental literacy plans. Teachers will be trained in environmental issues and allowed to apply for grant funding to support environmental education. The eligibility of environmental education and field-based learning will be determined by a set of standards set forth in the bill. It will also provide for an Office of Environmental Education within the Department of Education. Read the bill at **http://thomas.loc.gov/cgi-bin/thomas**.

Millennial Generation Thoughts About Natural Areas

By Rachel Gardner, Student, Kansas State University

I'm Rachel Gardner. I'm 19 and a freshman in the College of Architecture, Planning and Design at Kansas State University. When I was asked to do this article, I realized that the most important issues to discuss from my perspective were: how the newest generation interacts with, or ignores, nature; what we consider natural areas; and why we behave the way we do.

Generally speaking, my age group (16- to 25-year-olds) is very out of touch with "the wild." There is nothing more natural to us than cotton clothing and the way our cell phone fits against our heads. Many of us were raised and trained by parents who, in conforming to society, are money-driven and enterprising, using every spare minute to do something they see as leading them to more prestige. In our society, high social status is the goal, and making more money is the path leading to it. Because of this philosophy, many parents simply don't have the time, or the energy, to take children into the more natural landscape. I differ because I was raised from my earliest days to be outside and enjoy all that nature has to offer. Encouraging parents to take young children outdoors more often would be step one to ensuring a public conscientious of natural areas.

My generation is wired for instant gratification; we are glued to technology; we are pantywaists. In short, we expect comfort and excitement and don't want to wait long to get them. But enjoying the outdoors is like eating Indian food: the first time it is quite shocking to the taste buds, almost unpleasant at first but you might get used to it. If you grew up eating Indian food, you wouldn't even flinch or shed a tear while eating it because it's comfortable. Enjoying the outdoors is similar: If you grew up adapting to the minor discomforts or the long waits while hunting and fishing, you would find them familiar and rewarding, but someone new to the experience might find their first time slightly shocking. The hardest job in turning my age group back around will be to convince them that the glories and pleasures of nature are worth the discomforts and waiting. This will be hard, seeing as many are couch potatoes whose idea of a thrilling afternoon is to lounge cozily and play video games.

I asked my friends what they considered a natural area, and they looked puzzled. Some asked: "Do you mean any place that has nature in it? Like a crop field, or a wooded area?" When I explained the true definition, all said they hadn't known there was a special designation and most said they'd never visited one. Of all the many things we are taught in school, would not it be easy to incorporate natural areas somewhere into the curriculum, perhaps in earth science? Along with encouraging parents to teach children a love and enjoyment of the outdoors, a knowledge and understanding of natural areas would be useful in helping my generation to maintain, support and enjoy them. Until these changes are made on a large scale, I will continue to educate and convince my friends of the joys and nuances of natural areas. ▲

At an early age my parents taught me of great blue herons and other things of nature, ensuring my lifelong awareness and appreciation.
Rachel Gardner

Missouri Master Naturalist

Missouri Master Naturalist is a community-based, adult natural resource education and volunteer program co-sponsored by the Missouri Department of Conservation and University of Missouri Extension. Through training and volunteer service at the local community level, the program engages Missourians in the stewardship of our state's natural resources. For more information about the program and chapter activities visit www.monaturalist.org.

Quotes from participants:
"I took the Master Naturalist training to help the community better understand how their actions affect the natural environment."

"I took the Master Naturalist training just so that I could learn more about our world for me. But now I realize that this kind of knowledge needs to be shared."

Restoration Musings

By Wayne Porath, Landowner

Spray serecia lespedeza, visit NRCS, burn warm season grass, inter-seed prairie forbs, disk up choked vegetation, split firewood, plant corn, visit the grandkids, attack the honey-do list—so much to do ... where to start?

Linda, my wife, and I grew up on neighboring farms in northwestern Iowa, where we both experienced a "draw of the land" at an early age. Our family farms were on the southern edge of the prairie pothole region of the upper Midwest; and in the 1950s, un-drained pothole marshes, lazy meandering streams and remnants of tall grass prairie still dotted the landscape. Our families' farms were diverse—primarily grain crops, hay/pasture, beef, dairy, hogs, and chickens, with a few sheep, ducks and horses in the mix as well. As kids, we fished and swam Lizard Creek in the summer and ice skated there in winter, while the adjacent glacial hills made for fantastic sledding. Grandpa sometimes took me fishing for bullheads at nearby Lizard Lake. It was a great place to grow up.

As our careers and raising our family began, little time or resources (money!) for anything but the essentials were available, so priorities changed. But the "land draw" persisted. Our backgrounds and my professional involvement in conservation work ensured we kept soil under our fingernails. On our 1-acre city lot we had large gardens—Linda with flowers, me with vegetables. In 1979 we had an opportunity to acquire 25 acres of rolling hills near the Missouri River. Since then, we have been able to expand our ownership to 260 acres, with tons of opportunities to be good land stewards.

Early on, our stewardship approach was crisp and directed; that is, food and cover establishment for select species of wildlife. I even planted some exotic species, for which I am still paying the piper! Our approach was working, but it seemed that we were constantly in battle with vegetation. **We needed a plan!**

But where to start? Because about 35 of our acres were enrolled in Conservation Reserve Program (CRP), that seemed like a good place. I quickly became acquainted on a first name basis with everybody at the local Natural Resources Conservation Service (NRCS) office. Our CRP contracts prescribed a cool season grass/legume combo—orchard grass and red clover—good livestock forage, but a long way from native vegetation. One of the CRP options was native warm season grasses (WSG), which seemed much better, so we successfully got the contract modified. We went to work, killing existing vegetation and preparing the seedbed. Thanks to Missouri Department of Conservation (MDC) and NRCS, warm season grass drills were available for loan to landowners and we planted big and little bluestem, Indian grass, sideoats grama, switch grass and eastern gama grass and waited for our new prairie to appear. We waited and waited.

Author enjoys vista created by his glade restoration project.
Linda Porath

It was a dry spring. We waited some more. Lots of weeds grew, but where were the grasses? I telephoned Steve Clubine, grassland specialist with MDC about this and he said, "Just have patience!" A few days later he stopped by, and indeed, the grasses were there—tiny, delicate things that were easily overlooked. Our "prairie" was on its way. The following year the grasses flourished. Even though we knew this was a long way from being a prairie community, it was a start, and it gave us the courage to try additional restorations.

We still needed a plan. About 80 percent of our land is forested, so I invited MDC forester Fred Crouse (now retired) out to do an inventory and write a forest stewardship incentive plan, or SIP for short. Fred is quite a sage and he observed that "You wildlife guys are all alike. You buy the crummiest timber around." I was encouraged by that! About that same time University of Missouri forestry professor John Dwyer was looking for a place for his class to practice inventory technique and write management plans. We offered our place and all of a sudden we had 25 plans, one from each student, plus the excellent plan prepared by Fred!

These plans identified many issues and opportunities. Several glade communities were present, each with severe cedar encroachment. Timber stand improvement and woodland restoration were possibilities, due to past abuse and major encroachment of black and sugar maple. Black walnut and locust trees were invading abandoned bottomland fields. Additional type conversions of existing CRP were possible through a revised Farm Bill. All these opportunities brought us back to our original question: "But where to start?"

We listed our goals simply as land stewardship, recreational enjoyment and economic viability. As land stewards, our practices would enhance natural values and features. Our land would serve as a retreat for us, our family and our friends in which we could enjoy and appreciate its values. Finally,

monetary return was necessary to sustain our budget!

Armed with plans, fortified by my plant and animal inventories—which had strong input on birds from John Smith, retired MDC assistant director; on herps from Jeff Briggler, MDC herpetologist; and on plants from Tim Smith, MDC botantist—we went to work.

An important early step was to **look for partners!** Getting help from MDC staff on birds, herps and plants was an example. Another was to look for partners who could provide technical expertise and cost-sharing for specific practices. So, back we went to our local Boone County NRCS office, which by now had been "infiltrated" by one of MDC's private land conservationists, Mark McCulloch. With input by Mark and Kim Reitz, NRCS resource conservationist, we soon had a whole suite of options to consider, many of which were viable to us.

I'll talk about a couple. One of the CRP practices offered in the 1990s was called "oak savanna." Under that practice, on forest-derived soils that likely once had open, savanna-like pre-settlement vegetation, plant species having evolved under those conditions could be established. So, on 13 acres we killed all existing vegetation and replaced it with some seven native grass species, 30 native perennial forbs, and a scattering of fire tolerant tree species, such as bur oak. We used 1-inch diameter Root Production Method (RPM) trees so they would have a head start. Soon big bluestem, Indian grass, blue sage, gray headed coneflower and New England aster were what we saw as we rounded the first curve on our field road. All was good. Then there were the deer—they loved to antler-rub the RPM trees. Oops, they made quick work of several before I got the tree protectors installed. Point for the notebook: Shoot more deer this fall!

Eastern red cedar had encroached on several glade sites while hard maples had become dominant mid- and under-story trees on many sites, both situations contrary to our desire for diverse natural communities. What to do about that? Well, I began to whack cedar, but I'm getting old and tire a lot quicker than in years back. There had to be a better way. So, back I go to the NRCS office. There I learned of a glade/savanna restoration option (limestone glade and dry-mesic limestone/dolomite woodland in Nelson, 2005) within the Wildlife Habitat Incentive Program (WHIP). Further, because both glades and savannas were considered rare habitats, the WHIP program would provide 75 percent cost-share for their restoration. Wow! That meant we could afford to do it under contract, so we submitted a WHIP proposal for a 25-acre project that included glade and savanna restoration, timber stand improvement and edge-feathering for wildlife. The project was approved. We contracted all but the edge-feathering which we did ourselves. This approach was advantageous to us for several reasons. Most importantly it reduced time and dollar constraints for us. Also important though, was the opportunity to learn. I followed the contract workers around like a puppy dog, learning the tricks of the trade. I now feel comfortable doing such a project completely on my own.

Another important thing to do is **"call in your chips."** We have kids and grandkids. What better way to have family bonding than to cut brush, apply herbicide or run a drip torch? Also, guests deer hunt on our farm. So, we have work days for habitat projects. We're retired, as are many of our friends. We partner with them on habitat projects, getting done projects none of us could do by ourselves. You get the drift.

The plant! One day I was walking on one of our glades, and I spotted a plant that I had never seen. Using Steyermark (1963) I keyed it out to yellow false mallow (*Malvastrum hispidum*, current name). It couldn't be, Steyermark didn't show it in Boone County. So I brought a specimen to Tim Smith and he confirmed the identification. How cool that was! We had a plant growing on our glade that had not been recorded in our area! It's an unimpressive little plant, but who cares. There it was! Partly because of finding the plant on our farm, Tim conducted a Missouri-wide survey in 2007, finding the plant in more places, and concluding it is not as rare as once thought. That is good.

We are beginning to see results of our work. Each year we find new plant species. Grassland bird species are common in our CRP fields. The glade not only harbors diverse plant species, but also interesting animals such as scorpions, skinks and copperheads. Understory vegetation is rebounding after years of suppression by maple or cedar. Each new finding gives us encouragement to do more. Our philosophy has changed from a single species or type to a community and landscape orientation.

Linda and I and, for that matter, our children and grandchildren, draw tremendous enjoyment from our land and the opportunities for natural community restoration offered there. Hopefully our family romps and work days will provide lifelong memories and stewardship values to our family. We recognize that we are but temporary stewards of those acres and must make the best of it while we can. This spring, as we walked through the glade admiring widow's cross, wild hyacinth, shooting star, rose verbena, the indigo bunting singing nearby, and the vista to the next ridge, we reflected how indeed fortunate we are to hold this stewardship opportunity and responsibility. Then we went back to work. So much to do, so little time. ▲

Nelson, P.W. 2005. The terrestrial natural communities of Missouri. Revised Edition. Missouri Natural Areas Committee. 550 pp.

Steyermark, J.A. 1963. Flora of Missouri. Iowa State University Press, Ames. 1,728 pages.

The postmodern notion that reality is construct—that we are what we program—suggests limitless human possibilities; but as the young spend less and less of their lives in natural surroundings, their senses narrow, physiologically and psychologically, and this reduces the richness of human experience.

Richard Louv. 2006. *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder.*

The MoNAC team benefits from various philosophical perspectives of its members, ensuring thorough evaluations in the decision process.
Gene Gardner, Missouri Department of Conservation

Philosophical Forces at Work to Designate and Manage Natural Areas

By Gene Gardner, Wildlife Diversity Chief, Missouri Department of Conservation

Missouri's natural areas are merely the pixels that remain from the once expansive mosaic of the pre-settlement landscape that make up what we call eco-regions. Our natural areas provide a vision of the best remaining natural communities. We can use these glimpses of the past to develop our future management actions for similar communities with restoration potential. Just as peoples' opinions vary regarding the ecological formula of biotic and abiotic elements that created a particular community type before man's influence, so do their opinions on how the hand of man can be used constructively to "restore" or manage that community. These philosophical perspectives have been the focus of many lively and constructive debates between members of the Missouri Natural Areas Committee (MoNAC). This is what I refer to as the yin and yang forces at work in the business of natural area designation and management.

The main goal of MoNAC is to include the best examples of every remaining type of natural community and geologic feature in the Missouri Natural Areas System. Therefore, a main order of business for MoNAC members is to coordinate the classification, inventory, designation and stewardship of the state's natural areas. Sounds easy enough, doesn't it? Perhaps classification and inventory are the easiest to accomplish and the least controversial. This might be an over-simplification, but after 30 years of wrestling with classification approaches, our ecologically-minded natural resources authorities pretty much agree on the pigeon-holes of community classifications (at least us lumpers feel comfortable). As for inventory (i.e., data gathering), isn't this stage frequently the fun part of our charge? Who among us doesn't wish for more days afield and the opportunity to recharge our primordial batteries through a close connection with nature. Now for the rub: The tasks of natural area

designation and stewardship (i.e., management actions) are the most challenging to MoNAC.

The philosophy of yin and yang lies at the heart of Chinese culture. The first references to yin and yang come from the *I Ching*, the five classic works compiled and edited by Confucius. Taken literally, yin and yang mean the dark side and sunny side of a hill. See, isn't this sounding more and more like it is somehow related to natural community management? In Chinese philosophy, the yin and yang symbol represents the interplay of the two primal cosmic forces in the universe. Yin (moon) is the receptive, passive, cold force. Yang (sun) is a more forceful, greater movement, hotter force. Equilibrium in the universe happens when the yin and yang forces are in balance. The Chinese believe problems arise not when the two forces are battling, but when there is an imbalance between them in the environment.

OK, what does all this have to do with natural areas? In the case of natural area designation, yin folks are proponents of establishing natural area boundaries around only that exact area of land or water that is currently of the highest quality, excluding any surrounding buffer area of lower quality. After all, it is this area that has the highest preservation value. On the other hand, yang folks promote the inclusion of much larger areas for natural area nominations, which may not currently represent the highest quality community, but which usually show restoration potential with additional management. Inclusion of buffer areas also frequently helps to delineate a more simplified boundary that is easier to manage than an irregular-shaped polygon. On the other hand, statewide tallies of community types may be misleading if padded with lower quality buffer acreages. The MoNAC strives for balance through open discussions, teamwork, and coordination, all which continue to play a key role in the successful Missouri Natural Areas Program. Natural area management is intended to be a multi-disciplinary approach where the MoNAC team thinks broadly and considers all programs and resource objectives of the partnering agencies when considering natural area nominations or formulating management recommendations.

Yin forces compel us to take more of a preservation approach (maintain the status quo) with minimal management actions (e.g., prescribed fire, herbicide application). Conversely, yang would have us take a more aggressive restoration approach in buffer areas (e.g., 2-year row cropping to eradicate fescue, patch/burn/grazing for grassland regeneration, timber harvest for intensive glade and woodland restoration). However, the core high-quality natural community sites of a natural area are managed with a yin approach that first seeks to do no harm. The yang forces are frequently more comfortable with the inclusion of roads within natural areas as firebreaks or access for equipment and workers. Public roads that facilitate access to natural areas or act as management lines are routinely taken advantage of to define the outer boundaries of natural areas. However, if we listen to our yin side, these same roads can bring forces in direct opposition to the desired natural community quality by being a corridor for invasive plants, encouraging inappropriate public access, fragment a community's connectivity, or simply interrupt the scenic qualities of a natural area.

Public access for hunting and other compatible recreational uses are rarely denied due solely to natural area designation, although philosophical differences in what constitutes compatible use frequently necessitate open discussions to reach harmony. Many natural areas have hiking only trails for access, but in some cases, trails that allow multi-use (i.e., bicycles and horses) run through them. For the same reasons stated above, yin forces compel us to close trails in natural areas, or at least re-route them along the edges to prevent resource degradation. However, yang compels us to recognize there are benefits to trails and is more willing to accept minimal impacts which may require constant management to prevent degradation. Agency mission also comes into play; for example, hunting is normally not permitted on state parks managed by MoDNR, while hunting is standard practice on Conservation Department properties. Equilibrium in these forces is attained by agreeing on an appropriate level of public access to natural areas on public lands on a case by case basis. Other than private lands, only the portions of some biologically sensitive cave natural areas have strict public access restrictions.

Dan Witter, retired Missouri Department of Conservation philosopher and forward thinker, once said, "Traditionally, fish and wildlife managers relied strictly on biological data to guide conservation. Today, managers must consider the complex and differing needs of people in their decisions."

If Confucius were still around and could see our society where decisions must include an evaluation of social, economic and political factors along with biological data, I think he would see how complex the battle has become between yin and yang when it comes to natural area conservation. Preserving the ecological integrity of a natural area with minimal human intervention *vs.* more aggressive management with compatible public use epitomizes the yin and yang interplay of these two forces. Such are the many challenges managers face in their quest to find balance and achieve harmony within the realm of public trust. ▲

Traditionally, fish and wildlife managers relied strictly on biological data to guide conservation. Today, managers must consider the complex and differing needs of people in their decisions.

Dan Witter, MDC, Retired

Feral Hogs—A Scourge to Natural Communities

By Rex Martensen, Private Land Field Program Supervisor, Missouri Department of Conservation

Do we have feral hogs in Missouri? Yes we do, and they are a serious concern! Their rooting and feeding behavior contributes to soil erosion, reduced water quality, and causes damage to agricultural lands including cropland, pasture and hayfields. Feral hogs are also a direct threat to natural resources and native wildlife, including endangered plants and animals. The spread of disease by feral hogs is another major concern and there is potential for these diseases to jeopardize people, pets and livestock and, in particular, the private pork industry in Missouri.

Feral hogs are established in over 20 counties in Missouri, primarily across the southern half of the state. While no population studies have been conducted, it is believed there are between 5,000 and 10,000 feral hogs, as a conservative estimate, in Missouri.

Eradication efforts by state and federal agencies have had a small impact on the spread of these unwanted, invasive animals. Deer hunters and lots of other people have also been killing hogs, but not to the extent necessary to stop their spread. Further complicating the eradication of feral hogs is the illegal release by some misguided individuals to establish new populations for the purpose of recreational hunting. This only spreads the negative effects of feral hogs to new areas of the state.

The Missouri Department of Conservation (MDC) and the Missouri Department of Natural Resources (MoDNR) have tried to concentrate hog eradication efforts on state land to protect sensitive or fragile areas. Recently, a special project was initiated using U.S. Fish and Wildlife Services funds to protect a federally endangered plant species that grows on MDC and MoDNR land. The project will enlist the help of two seasonal employees who will build fence around known populations of this rare plant to keep hogs out. Other efforts of protection include trapping and eradicating feral hogs from that geographical area.

The seriousness of feral hogs has also caught the attention of Gov. Matt Blunt. By executive order, Blunt created a multi-agency task force, including state, federal and private entities, to address the many issues associated with feral hogs. The order called for a plan of action to explore the most effective ways to deal with feral hogs in Missouri. The report of the task force was completed in April. Citizens should report knowledge of feral hog populations to their nearest MDC office. For more detailed information, see:
http://mdc.mo.gov/landown/wild/nuisance/hogs/ ▲

MDC Wildlife Damage Biologist Jim Braithwait with some pigs caught in cooperation with USDA, Wildlife Services
USDA Wildlife Services, Dan McMurtry

It's about the Future

By Lynn Barnickol, MoNAC Member and Forestry Field Programs Supervisor, Missouri Department of Conservation

Lunch involved cooling a watermelon in Cedar Spring on the Current River while fishing from a hand-made wooden jon boat, and learning to identify fish species. Those are things I am thankful my family shared with me and which have helped me serve as Missouri Department of Conservation's (MDC) Forestry Division representative on the Missouri Natural Areas Committee.

My dad was a fisheries biologist who taught me that "perch" is a catch-all local name for a group of fish more correctly known as bluegill, longear sunfish and green sunfish. He also provided lessons about jack-in-the-pulpit being a showy, interesting plant that indicates protected, moist soil conditions. Those experiences of paying attention to detail have helped me serve MoNAC.

Fishing Current River from a 22-foot long jon boat was special knowing that my granddad had built it from lumber that he saw milled from locally grown shortleaf pine. As a 20-something in 1917, granddad's job was to fire the steam engines on logging tramlines traversing Carter County. Later he knew the frustration of realizing that many of the large, tall pines were only majestic, hollow relics of previous harvests and not suited for lumber. The exploitive example references a lesson that managing a resource involves planning for the future needs of people and natural resources. Those kinds of observations have helped me serve on MONAC.

Later I learned about managing for sustainability. Working as a resource forester and in my present assignment in the state land management program have helped me confirm that MDC foresters and biologists manage for sustaining natural resources. To me, sustainability managing natural communities can be boiled down to three core elements: retaining species of plants and animals, retaining soil resources, and managing the land so we retain or perhaps improve the quality of water coming from landscapes. Those concepts undergird my thoughts when I am evaluating proposed plans for managing natural areas.

I listen to co-workers make observations involving natural areas. One stated that natural areas are not held in vacuums, but are dynamic, and managers should hold out for hands-on active management. A second believes that designating natural areas and planning for managing them should be a team effort involving local work teams as it is their work schedule and skills that will be needed for success. A third believes the designation of a natural area should be considered a reward for teamwork that culminates when all involved pull together behind a common goal. I believe that natural areas are places where we make plans, put our knowledge to the test, and hold accountablility for results.

Lynn Barnickol
Gail Barnickol

Regular inspections of natural areas by biologists and foresters sometimes point out a need for in-depth assessment. Sugar maple was reported as encroaching on Elmslie Forest Natural Area, a white oak woodland natural community that had been passively managed.

The local work team of forester and biologist described a situation where there was too much shade causing elements of the natural community to suffer. Recommendations were to remove some of the trees and use prescribed fire to invigorate the ground flora. Use of best management practices would help protect soil and water resources. The short-term objectives are to stimulate the lacking ground flora and help control the sugar maple. Long-term objectives provide conditions so that white oak seedlings can be the future majestic and gnarly, large diameter white oaks, perhaps a few hundred years into the future. My hope is that people will visit Elmslie for a rewarding experience realizing the management is more focused on the health of the natural community including trees, ground flora, animals, soil and water resources and that we are on a sustainable path for the future. ▲

Natural Area Additions and Declassifications

By Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation

Two new areas, one addition, and one declassification bring the count of designated Missouri natural areas within the Missouri Natural Areas System to 182 totaling 65,343 acres. These areas were recommended for inclusion or removal from the Missouri Natural Areas System by the Missouri Natural Areas Committee, Missouri Department of Natural Resources (MoDNR) and Missouri Department of Conservation (MDC) agency directors and the Missouri Conservation Commission:

Razor Hollow Natural Area (new), is a 923-acre natural area in Warren County within the Daniel Boone Conservation Area. This area features dry chert and limestone/ dolomite woodlands; dry-mesic chert, limestone/dolomite, sandstone, and loess/glacial till woodlands; and sandstone glades. Numerous sandstone cliffs and wet-weather waterfalls frame the site's scenic headwater creeks. Three rare amphibian species utilize the area's habitats. The area is botanically rich and supports a diverse bird fauna.

Spiderlily Natural Area (new), is a 354-acre natural area in Ripley County within the Mudpuppy Conservation Area. This site features 2.5 miles of the Little Black River and its associated riparian corridor. This stretch of the Little Black River has been designated an "Outstanding State Resource Water" by MoDNR in 2005. The natural area's aquatic habitats support 60 native fish species and 22 native mussel species, including six rarely encountered mussels. Bald eagles and swamp rabbits utilize the area's bottomland forests.

Horton Bottoms Natural Area (addition), is a 1,118-acre addition to the original 227-acre natural area (designated in 1987) contained within Four Rivers Conservation Area in Vernon County. This substantial addition recognizes one of the premier natural floodplain ecosystems in the Osage Plains Ecological Section. This area contains some of the last remnants of wet prairie in Missouri, intermingled with freshwater marsh, shrub swamp, slough, bottomland forest and woodland natural communities. The natural area is framed by the confluence of the Little Osage and Marmaton rivers—two of the last unchannelized and mainly unimpounded prairie rivers in Missouri. The site features the largest tract of bottomland forest and woodland remaining in the Osage Plains. The area supports a diverse bird fauna including bald eagles and mixed species heron colonies.

Reifsnider Forest Natural Area (declassification) was designated in 1971. This 22-acre natural area contained within Reifsnider Conservation Area in Warren County encompasses a tract of dry-mesic loess/glacial till forest. It would not be considered as a natural area candidate today because it is too small and not of sufficient natural quality to qualify for natural area status. At the time of its designation, the Missouri Natural Features Inventory had just begun and our knowledge base of natural communities was rapidly expanding. The site contains no species of conservation concern. Better examples of this natural community are found on the recently designated Razor Hollow Natural Area on nearby Daniel Boone Conservation Area. ▲

Razor Hollow Natural Area
Gus Raeker, Missouri Department of Conservation

Spiderlily Natural Area
Mike Leahy, Missouri Department of Conservation

Horton Bottoms Natural Area
Mike Leahy, Missouri Department of Conservation

MDC Presents Natural Areas Awards

By Mike Leahy, Natural Areas Coordinator, Missouri Department of Conservation

Central to the Missouri Natural Areas System is the management and protection work performed by dedicated personnel. Therefore, the Missouri Department of Conservation Natural Areas Committee recognizes outstanding efforts by individuals and work teams through either a Natural Areas Managers Award or a Special Recognition Award. Recipients for 2007 were:

Conservation Agent Brad Hadley—
Special Recognition Award

The committee selected Conservation Agent Brad Hadley for the Special Recognition Award. Brad has been a conservation agent with the Department since 1999 in Shannon County. Brad has worked tirelessly to protect the 16 designated natural areas in Shannon County, the most natural areas of any county in Missouri. In particular, Brad has been instrumental in protecting the Sunklands Natural Area from illegal all-terrain vehicle use. At the Sunklands Natural Area, Brad has worked diligently with the area management staff and the public to create an environment that both supported legitimate public use and protected the valuable natural resources of the Sunklands Natural Area. Throughout this process, Brad maintained a positive, determined and fair-minded attitude, certainly deserving of special recognition.

The Prairie District Wildlife Work Team—
Natural Areas Managers Award

The Department Natural Areas Committee also selected David Darrow and his district team of Jim Schultz, Duane Lewis, Laramie Todd and Gary Banwart as the 2007 recipients of the Natural Areas Managers Award. Dave has been with the Department and Wildlife Division since 1995. Over the last 12 years, David has worked with exceptional commitment to the prairie resource. Shortly after Dave arrived, he started instituting fall and winter burns on the public prairies in the Prairie District of Barton, Jasper and Vernon counties, which was a first. He is constantly looking for new and innovative management options for his areas and has also been very active in prairie restoration in the Southwest Region.

Dave and his work team manage 14 Department prairie conservation areas, including two prairie natural areas. This is the largest number of Department prairie tracts managed by a Department work team. Recently Dave and his crew have been involved with utilizing a patch-burn grazing management system on the prairie at Bushwacker Lake Conservation Area, including monitoring northern bobwhite population response to this management practice on his own initiative. Dave and his work crew have all taken on a great attitude of dedication over several years to learn, explore and just plain work hard in the efforts of grassland wildlife conservation. ▲

Director John Hoskins (right) and Natural Areas Coordinator Mike Leahy (left) recognized Brad Hadley with the 2007 Natural Areas Special Recognition Award.
Cliff White, Missouri Department of Conservation

Assistant Director David Erickson (back, right) and Mike Leahy (front, right) recognized Wildlife staff David Darrow (front, center), Jim Schultz, Duane Lewis, Laramie Todd, and Gary Banwart with the 2007 Natural Areas Managers Award.
Cliff White, Missouri Department of Conservation

MISSOURI
Natural Areas
NEWSLETTER
Spring 2008

Calendar of Events

July 31—Aug. 3, 2008
QUAIL UNLIMITED NATIONAL CONVENTION
University Plaza and Convention Center, Springfield, Mo.
www.qu.org/content/events
Theme: Flight to the Future

Aug. 4-8, 2008
21ST NORTH AMERICAN PRAIRIE CONFERENCE
Winona State University, Winona, Minn.
www.bio.winona.edu/NAPC
Theme: The Prairie Meets the River—The Importance of Water in the Prairie Environment

Sept. 20, 2008—10 a.m. to 4 p.m.
PRAIRIE DAY—SHAW NATURE PRESERVE AND MDC
Shaw Nature Preserve, Gray Summit, Mo.
www.shawnature.org/events/prairieday.aspx
Activities: This fun-filled family event portrays prairie heritage through activities and demonstrations, and showcases the reserve's 250-acre re-created tall grass prairie. Hike with a naturalist through the prairie to learn about prairie life, check out the teepee, play pioneer games, listen to a live band, and watch weavers, spinners and other craft demonstrations. Enjoy exhibits, living history re-enactments and see an archaeologist and a flint-knapper display and interpret artifacts of prairie life.

Sept. 20, 2008
PRAIRIE DAY—MDC, MPF, KC PARKS AND RECREATION, KCPL, KC WILDLANDS
Jerry Smith Park, Kansas City
Contact: Stacy Davis 816-228-3766

Sept. 27, 2008
PRAIRIE JUBILEE—DIVISION OF PARKS, MDNR AND MISSOURI PRAIRIE FOUNDATION
Prairie State Park, Liberal, Mo.
www.moprairie.com/Events.html
Activities: Prairie Jubilee celebrates the tallgrass prairie. Step back in time and visit trappers, hunters, pioneers and native Americans. Music, storytelling, children's activities, contests, displays, and guided wagon rides to view the bison will be available. A bison lunch will be served for a small fee.

Oct. 11, 2008
COLE CAMP PRAIRIE DAY/OKTOBERFEST—COLE CAMP, MDC, AUDUBON MISSOURI
Cole Camp, Mo.
Contact: 660-668-3810

Oct. 14-17, 2008
NATIONAL ROADSIDE VEGETATION MANAGEMENT ASSOCIATION ANNUAL CONFERENCE
Chateau Hotel, Branson, Mo.
www.nrvma.org/
Special Event: Celebrate 25th anniversary of this association, focusing on partnerships in roadside management.

Oct. 14-17, 2008
35TH NATURAL AREAS CONFERENCE
A joint conference of the Natural Areas Association and the National Association of Exotic Pest Plant Councils
The Doubletree Hotel - Nashville, Tenn.
www.naturalarea.org
Theme: Natural Areas Revival in Music City: Tuning into a Changing Climate and Biological Invasion

Oct. 21-22, 2008
2008 MISSOURI OZARK FOREST ECOSYSTEM PROJECT (MOFEP) WORKSHOP
Civic Center—West Plains, Mo.
http://mofep.mdc.mo.gov/Docs/Oct2008WorkshopProgram.pdf
Features: Workshop addressing implications of key findings to management, followed by field tour near Ellington

(continued on page 19)

Calendar of Events *(continued from page 18)*

Nov. 8-12, 2008
THE WILDLIFE SOCIETY 15TH ANNUAL CONFERENCE
Miami, Florida
http://www.wildlife.org/miami08/
Highlights: Plenary–Thriving within Limits. Learning opportunities through research reporting/discussion, management practices, policy issues, hands-on training in workshops, networking among biologists, field trips. Many workshops/symposia, including: patterns of species occurrence, adaptive management, landscape genetics, invasive species implications.

Dec. 14-17, 2008
69TH MIDWEST FISH AND WILDLIFE CONFERENCE
Hyatt Regency in downtown Columbus, Ohio
http://www.dnr.state.oh.us/wildlife/tabid/19507/Default.aspx
Theme: Foundation for the Future of Fish and Wildlife Management.

Feb. 4-6, 2009
MISSOURI NATURAL RESOURCES CONFERENCE
Tan-Tar-A Resort and Golf Club
http://www.mnrc.org
Theme: Global Trends, Missouri Impacts: Adapting to Climate Change

Current Missouri Natural Areas Committee (MoNAC) Roster

MoNAC Members

Department of Natural Resources:
Dan Paige, Chair (2007-2009)—Dan.Paige@dnr.mo.gov
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It is a century now since Darwin gave us the first glimpse of the origin of species. We know now what was unknown to all the preceding caravan of generations: that men are only fellow voyagers with other creatures in the odyssey of evolution. This new knowledge should have given us, by this time, a sense of kinship with other fellow-creatures; a wish to live and let live; a sense of wonder over the magnitude and duration of the biotic enterprise.

Aldo Leopold 1949. "On a Monument to the Pigeon." *A Sand County Almanac and Sketches Here and There*

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MISSOURI Natural Areas NEWSLETTER

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Thanks to MDC's Kevin Lanahan for web updates and the print shop staff for publishing this issue. The newsletter can be found at **www.mdc.mo.gov/n1694** or linked through any of the MoNAC partner-agency websites.

The *Missouri Natural Areas Directory* is in the process of revision and will be a new web-based document. In the meantime the 1996 *Missouri Natural Areas Directory* is available to see online at **www.mdc.mo.gov/areas/natareas**. For a free copy of the revised brochure, *The Missouri Natural Areas Program*, information on a specific natural area, or comments about the *Missouri Natural Areas Newsletter,* please contact either **mike.currier@dnr.mo.gov** or **michael.leahy@mdc.mo.gov**.

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